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Guidelines for the Observation of Performance Specification Tests of Continuous Emission Monitors

Entropy Environmentalists, Inc.
Research Triangle Park, NC

Prepared for

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When stationary source owners or operators plan to conduct Performance Specification Tests of installed continuous emission monitors, they are required to notify the applicable control agency. The agency should then appoint a representative to observe the tests.

This document contains general guidelines for the agency observer on the performance of pretest negotiations, on-site observations, and the preparation of his report. Also, an observer's checklist for these activities is included.

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Stationary Source Compliance Division
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ABSTRACT

When stationary source owners or operators plan to conduct Performance Specification Tests of installed continuous emission monitors, they are required to notify the applicable control agency. The agency should then appoint a representative to observe the tests.

This document contains general guidelines for the agency observer on the performance of pretest negotiations, on-site observations, and the preparation of his report. Also, an observer's checklist for these activities is included.

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GUIDELINES FOR THE OBSERVATION OF CONTINUOUS EMISSION MONITOR PERFORMANCE SPECIFICATION TESTS

1.0 Introduction

When stationary source owners or operators conduct Performance Specification Tests (PSTs) of installed continuous emission monitors (CEMs) as required by New Source Performance Standards (NSPS), State Implementation Plans (SIP), or other local regulations, the agency appoints a representative to observe the tests. This manual is intended to provide guidelines for the representative's role and general responsibilities as an observer. Detailed explanations of the PST and specific instructions and recommendations for the test report reviewer appear in a separate manual entitled, "Monitor Performance Tests for Pollutant and Diluent Gas Monitors: Reporting Requirements, Report Format, and Review Procedures." The observer is referred to this manual and to the appropriate Federal and State regulations for detailed technical information concerning the tests.

The source owner or operator is responsible for planning and conducting the PST. In most cases, a consultant is hired by the owner or operator to perform the test. Typically, this consultant is designated as an authorized representative of the source and, throughout this document, is referred to as "tester" and "test consultant."

The functions of the agency observer are to represent the interests of the agency during the planning and performance of the PST, and to provide appropriate documentation of the PST for the test report reviewer. The observer must ensure that the PST is performed according to the procedures delineated in

the Performance Specifications (40 CFR 60, Appendix B). In doing so, the observer must work cooperatively with the source and with the test consultant. He must be specific and forthright in his requests, while being respectful of the positions of the other parties involved. Antagonistic or adversary approaches will usually defeat themselves in these situations. Cooperation is in the best interest of all parties, and will result in maximum success.

The activities of the agency observer may be divided into three phases: pretest activities, onsite observation, and preparation of the observer's report. These activities are discussed in the following sections.

It is strongly recommended that all of the observer's activities be conducted by the same individual; when more than one person are involved, all persons representing the agency must work closely together to ensure an effective agency role in the PST.

The appendix of this document contains a detailed checklist for the PST observer. Separate checklists for preliminary communications, pretest meetings, and onsite observation are included. The observer should review these checklists and use them appropriately to document all phases of the test sequence.

2.0 Pretest Activities

The source owner or operator is required to notify the agency of his intention to conduct the PST. (NSPS sources are required to give 30 days notice; requirements for SIP sources may vary.) The notice indicates that arrangements for the test are underway and that the source is prepared to schedule the test. Once source notification has been received, an agency representative should be designated to observe the test.

Initially, the observer should establish contact with the source owner or operator and inform him that he plans to observe the test. The source is then responsible for notifying the observer of all PST activities (i.e., test schedule, pretest meeting, etc.). This initial agency-source contact establishes the lines of communication among all parties from the outset of the test sequence. At this time, the observer should query the source owner or operator for information pertaining to the source (e.g., identification and location, plant and monitor design and operating parameters, pollutants to be measured, sampling locations, data from previous PST, etc.), and pertaining to the tester (e.g., identification and location, sampling equipment and laboratory information, test methods to be used, etc.).

After the source is contacted, the observer should familiarize himself with the operating principles of the installed CEM, the source process and anticipated operating conditions, and the requisite test methodology. The observer should also review available information from control agency records of the monitor (and/or relevant source emission tests). He should discuss procedural details not specified in the Reference Methods and Performance Specifications with the source and the tester, and achieve an agency-source-tester concurrence prior to initiation of the test.

The observer should attend any pretest meeting held by the source. Although there is no requirement for pretest meetings, these meetings and other informal gatherings of source, testing, and agency personnel provide opportunities for clarification and negotiation of issues, and for the dissemination of information about the test protocol and its possible problems. Typically, pretest meetings are scheduled for the convenience of the source and the tester; however, most sources are quite willing to accomodate the observer's schedule provided that they know in advance that he plans to attend and if a schedule satisfactory for all three parties can be arranged.

The source and/or the tester must formulate a test protocol and submit it to the observer for review and approval before the initiation of the PST. The observer must make clear any special requests he has for the tester or the source at this time. He should also review and approve (or disapprove) any modifications to the standard procedures or other procedures not prescribed in the Performance Specifications proposed by the tester. The observer should include all draft versions and the finalized protocol in his report.

The observer must know the limits of his authority. Undoubtedly, the test observer will be called upon to determine the acceptability of test procedures, sampling methodology, etc. If the observer does not have authority for such decisions, he must be able to contact an agency representative who has such authority. Failure to establish this line of authority in advance will hinder the satisfactory completion of the test program, which is the goal of the source, the tester, and the agency.

The test schedule should be finalized during the pretest negotiations. However, this test schedule is dependent upon many variable factors: boiler operation, monitor operation, process conditions, etc. Testing cannot begin

until satisfactory conditions are achieved simultaneously for all of these variables, and despite the most careful planning, delays in the test schedule are common. The tester and the observer must therefore be ready when appropriate conditions are achieved. Once the PST has commenced, test problems may cause additional delays. To complete the tests, the tester may continue his work well into the evening and for most of the night, provided that proper lighting is available. The observer should consult with the tester during the pretest negotiations as to his firm's policy regarding the length of the test day. Thus, the observer must be flexible and accommodate the tester's schedule.

If additional testing, modified sampling procedures, or additional quality assurance procedures, etc. are necessary to accommodate particular regulatory provisions, monitor-specific problems, and/or unusual source-specific circumstances, the observer must inform the source and tester of any such deviations from standard procedure as early as possible. Failure to do so may compromise the test results and create problems.

Before the PST, the observer should review the "Onsite Observation" portion of the observer's checklist contained in the appendix of this document. The checklist is designed to apply to all types of continuous monitor PSTs. For the checklist to be useful, the observer must be familiar with the portions of it that apply to his particular situation, and he should note in advance those portions of the checklist that must be completed.

The checklist is intended to facilitate the job of the observer; it is not a complete, self-contained report in itself. Although its length may seem cumbersome, it provides a format for the recording of information the observer may wish to use. The observer himself, however, must finally decide which information is important and which is not.

In conclusion, responsibilities and activities of the agency and the observer during the pretest period may be summarized as follows:

1. The agency should designate an observer upon receiving notice from the source.

2. The observer should contact the source and obtain pertinent information.

3. The observer should review all available pertinent information, both on the source and on the PST methodology.

4. The observer, as agency representative, should clarify his authority to the source and tester. If the necessary authority resides outside the observer, contingency plans should be made for contacting the agency representative who is authorized to make decisions.

5. The observer should attend the pretest meeting, if possible.

6. Before the initiation of the PST, the observer should review the test protocol, negotiate necessary changes, and approve it.

7. The observer should obtain the test schedule and make appropriate plans to attend.

8. The observer should review the observer's checklist and utilize it for the onsite observation.

3.0 Onsite Observation

The observation of the PST is perhaps the most important of the observer's responsibilities following the establishment of the test protocol. The observer must perform all preparatory activities to maximize the effectiveness of his observation. He must complete the gathering of preliminary information prior to the initiation of testing so that he can give his full attention to the performance of the test.

The observer should arrive onsite on time for any pretest activities and should attend any informal meetings with the tester and the source immediately before the test to settle last minute details. He may be asked to observe and approve non-standard procedures to be employed during the test. Consequently, the observer should allow ample time for these activities and for any other pretest inspections he may wish to perform. The observer should obtain and examine: (1) the results of any tests for which the monitor manufacturer is allowed to certify conformance with the applicable specifications (i.e., design specification tests for transmissometers, some calibration error checks for some gas monitors), (2) the results of calibration gas analysis and/or manufacturer's certification of calibration gas cell values, and (3) the required pretest calibration results for the tester's sampling equipment.

Once testing commences, the observer should watch all aspects of the test, including test procedures, monitor operation, and source operating conditions. It is unnecessary and time consuming for the observer to make his own separate records of the data; he can observe the tester's record and initial the data sheets to ensure that the data recorded are the data reported. The observer must make judicious use of the checklist to note his observations; however, time spent completing the checklist is time not spent observing. Therefore,

the observer is advised to review the checklist in advance of the test and to mark the appropriate information to be completed; if this is not done, the observer could spend the majority of the test period working on the checklist.

The observer should be considerate of the tester during the PST; the tester's attention will be focused on getting the job done, and during some phases of the testing, distractions could jeopardize his work. When the observer has questions for the tester, he should wait until an appropriate time to ask them, unless it is imperative that the questions be resolved before testing proceeds. Also, the observer should be respectful of the source's and tester's equipment. Most sampling equipment is quite expensive, and much of it is easily damaged. In general, a "hands-off" posture is the safest approach.

Regardless of the care taken to resolve all procedural questions in advance, unforeseen situations are encountered frequently during the actual test period. In such instances, the observer must approve or disapprove a source's or tester's proposed solution on the spot. If he does not have the authority to make such decisions, he should contact an agency representative having the necessary authority. Any delays at this critical stage will result in wasting valuable time and money.

At the conclusion of the test, the observer may wish to inspect the tester's data sheets and initial them. Such a request should be made in the spirit of cooperation. Indeed, the tester may wish to receive feedback from the observer, and often such an interchange can prove mutually beneficial. The observer should remember that his ultimate goal is to obtain reliable PST data for the agency, and he should be willing to share his subjective and objective observations and information.

In conclusion, the observer's activities during the test may be summarized as follows:

1. The observer should arrive onsite well in advance of the scheduled beginning of the test to make final preparations for accurate observation of both source and tester operations.

2. The observer should review data and/or test results from any manufacturer's certification of conformance with specifications and of any calibration gas analysis.

3. The observer should devote his primary energies to a careful observation of the test procedures.

4. The observer should be considerate of the source and the tester and work with them to achieve the desired results.

5. The observer should be prepared to rule on problems that may arise during the course of the test.

6. The observer should confer with the tester at the conclusion of the test to exchange appropriate information and to discuss the data quality and possible deficiencies.

4.0 Observer's Report

At the conclusion of the test program, the observer must prepare a report containing all pertinent information from his observation activities. The observer's report aids the test report reviewer. Although the soundest and most expedient practice is for the test observer to review the report, this is not always feasible. Therefore, the observer should prepare a complete report that can serve as an independent documentation of the test.

The outline below suggests an organization for an observer's report. While the observer will finally determine the most appropriate report format, the report must document thoroughly the activities of the observer, the source, and the tester to be useful to the reviewer. Although recording the test details is tedious, it is necessary to enable the reviewer to evaluate the test report accurately. The observer must make notations of problems encountered, and also state the acceptability of procedures. The observer should be specific and concise, regardless of the report format chosen.

Preceding page blank

Observer's Report

I. Background Information

- Source identification (station, unit)
- Tester identification
- Observer identification
- Test date
- Monitor description and location
- Pertinent source operational parameters
- Other useful background information

II. Pretest Communications

- Summary of pretest meeting, if one was held
- Copies of all protocols proposed during pretest negotiations
- Complete copy of finalized protocol
- Notations on communications among all parties before testing
- Notations of any deviations in standard methodology approved by observer
- Notations of any special tests or additional procedures recommended by observer

III. Onsite Observations

- Observer's checklist and data from tests, well annotated with pertinent information and notations
- Additional descriptions of checklist items meriting further discussion
- General notes from onsite observations not found on the checklist
- Notes on information-sharing activities conducted at conclusion of test program (i.e., did the observer initial the tester's data sheets; did the tester have access to the observer's notes; etc.)

IV. Summary and Conclusions

(The observer may wish to present this information at the beginning, rather than at the end, of his report.)

- Concise listing of any observations or information that may affect test results.

- Conclusions on the part of the observer as to the validity of the test procedures employed and the general successfulness of the test.

APPENDIX

CONTINUOUS EMISSIONS MONITOR (CEM)
PERFORMANCE SPECIFICATION TEST (PST)

OBSERVATION REPORT

Plant: _____

Unit: _____

Date of PST: _____

Observer: _____

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CONTINUOUS EMISSIONS MONITORING PERFORMANCE SPECIFICATION TEST OBSERVATION REPORT

PLANT NAME: _____ **DATE OF PST:** _____

UNIT TESTED: _____

LOCATION: _____

_____

OBSERVED BY: _____

_____

_____

_____

SUMMARY OF TEST PROCEDURES

Test	SO_2	NO_x	O_2 or CO_2	Opacity	Moisture
Reference method					
Calibration error					Code 1. Acceptable 2. Unacceptable 3. Indeterminate 4. Not observed 5. Not performed
Response time					
2-h drift					
24-h drift					
Calibration check					
Other:					

REPORT CONTENTS

_____ Preliminary communications summary

_____ Pretest meeting report or notes

_____ Observer's data sheets

_____ Supplemental observation report

_____ Other: _____

_____

CONTINUOUS EMISSION MONITOR (CEM)
OBSERVER'S FORMS

INSTRUCTIONS FOR OBSERVER:

PART 1 (Pages 1-A through 4-A): Preliminary Communication Summary

Part 1, the Preliminary Communication Summary, is to be filled in by the source. Detach pages 1-A through 5-A and fill in the name and address of the person or agency to whom you wish the form returned in the space provided at the beginning of the first page. Forward the Communication Form to the source and request that he/she complete and return it as soon as possible.

PART 2 (Pages 1-B through 5-B): Pretest Meeting Summary

Part 2, the Pretest Meeting Summary, which begins immediately after the Communication Summary and continues through page 8-B, is intended to be an outline of the information that should be collected prior to the actual testing. This section is to be filled in by the observer during the pretest meeting.

PART 3 (Pages 1-C to End): Observer's Data Sheets

Part 3, the Observer's Data Sheets, is to be filled in by the observer during the actual test period. The form is designed so that it may be used for general PST observations of several different types of sources, and some of the questions may not be applicable to a specific source or observation. It is not expected that the observer will be able to collect all of the information outlined on the data sheets. Record only that information that corresponds to activities actually observed.

CONTINUOUS EMISSIONS MONITORING (CEM) PERFORMANCE SPECIFICATION TEST
PRELIMINARY COMMUNICATION SUMMARY

*COMPLETE AND RETURN TO:
(OBSERVER)

_____

_____ Phone contact date: _____

_____ Mailing date: _____

_____ Return date: _____

THE FOLLOWING INFORMATION IS TO BE PROVIDED BY PLANT PERSONNEL AND THE FORM RETURNED TO THE OBSERVER:

1. Plant name: _____

2. Mailing address: _____

_____

_____

3. Site location: _____

_____

_____

4. Source(s) to be tested: _____

_____

_____

_____

5. Plant contacts:

Plant manager: _____ Phone: _____

Environmental coordinator: _____ Phone: _____

CEM Contact: _____ Phone: _____

Test team leader: _____ Phone: _____

*Communication form (pages 1-A through 4-A) to be completed and returned 30 days prior to pretest meeting.

PRELIMINARY COMMUNICATION SUMMARY

6. Process description:

   A. Raw materials and/or fuel used: _____

   B. End product(s): _____

   C. Maximum production capacity: _____

   Normal emission operating range: SO_2: _____ NO_x: _____

   D. Other: _____

7. Dates for:

		Date Planned/Scheduled	Actual Date
A.	Initial startup		
B.	Maximum production rate reached		
C.	60 days after maximum production reached		
D.	180 days after startup		
E.	Preevaluation/pretest meeting		
F.	Conditioning period for:		
	1. Opacity		
	2. SO_2		
	3. NO_x		
	4. Diluent (O_2, CO_2)		
	5. Other		

8. Monitors to be tested:	Anticipated conditioning date:	Anticipated performance test dates:

PRELIMINARY COMMUNICATION SUMMARY

9. **Does the test contractor participate in an external audit program?**

   Yes: _____ No: _____

   If so, are the audit samples (A) Gaseous (cylinders)? _____

   or (B) Liquid SO_2/NO_x? _____

   If not, is the test contractor willing to participate in an external audit program? Yes: _____ No: _____

10. **Schematic diagram of monitor location:**

    (Include stack/duct cross section dimensions, straight runs before and after location (with distances in diameters), and locations of air in-leakages).

PRELIMINARY COMMUNICATION SUMMARY

11. Tests are to be performed by:

Name: _____

Address: _____

_____

_____

Phone: _____

Contacts' names:

Name: _____

Address: _____

_____

_____

Phone: _____

Name: _____

Address: _____

_____

_____

Phone: _____

PRETEST MEETING SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

General CEM information: Date: _____

1. Plant: _____

Is this the initial PST? Yes _____ No _____

If not, when was the last PST performed? _____

Describe problems encountered during last PST: _____

_____

_____

_____

2. Pretest meeting participants:

Name:	Affiliation:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

3. Performance test procedures:

	Standard Test (Reference Method)	Departures From Standard Test
Opacity	_____	_____
	_____	_____
SO_2	_____	_____
	_____	_____
NO_x	_____	_____
	_____	_____
Diluents	_____	_____
	_____	_____
Moisture	_____	_____
	_____	_____
CO	_____	_____

PRETEST MEETING SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

4. Testing

	Organization and person performing test*/proposed test date		
	Opacity/Date	Pollutant/Date	Diluent/Date
Calibration error			
Response time			
Zero/calibration drift-2-h			
Zero/calibration drift-24-h			
Accuracy			

5. General CEM system characteristics

	Opacity	SO_2	NO_x	Diluent	Other	Other
Manufacturer						
Model No.						
Serial No.						
Dates for: 1. System startup: 2. Zero alignment on cool, clear flue: 3. Anticipated conditioning period: 4. Anticipated operational test period (OTP):						
Final alignments prior to OTP[1]?						
Data recorder type[2]:						
System span value[3]:						
% zero offset:						
Daily span-check method[4]:						
Daily zero method[5]:						
Automatic zero compensation?						
Measured "wet" or "dry":						

*If different from Preliminary Communication Summary, update here.

[1] Operational test period of 168 hours
[2] Specify—strip chart, computer, data logger, mag tape or other
[3] 100% of system output
[4] Cell or gas injection
[5] Means for simulating zero value for daily zero check

PRETEST MEETING SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

6. Fuel analysis or process feed rate? _____

_____

_____

7. "F" factor, if appropriate: _____

_____

_____

_____

8. Calibration gas verification method: _____

SO_2: _____

_____

_____

NO_x: _____

_____

_____

Diluents (O_2, CO_2): _____

_____

_____

Other (e.g., CO): _____

_____

_____

9. Is there provision for injecting calibration gas at probe? (If not, explain) _____

_____

_____

_____

PRETEST MEETING SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

11. Do all monitors meet the location and stratification requirements as outlined by the applicable performance specifications?

Yes: _____ No: _____ If no, explain: _____

_____

_____

This was determined by:

A. Physical location
Per regulation (40 CFR 60 Appendix B) Yes: _____ No: _____

B. Testing Yes: _____ No: _____

If determined by testing, explain tests and attach results: _____

_____

_____

12. Does monitor installation site meet vendor operating environment requirements (temperature, humidity, vibration, etc.)?*

_____

_____

_____

_____

_____

13. Describe the relative accuracy reference method sampling system location in relation to the monitor location.* _____

_____

_____

_____

_____

14. Are there adequate provisions for the reference method test (i.e., access, sampling ports, sufficient work area, suitable work environment, etc.)?*

_____

_____

_____

15. Major points of action to be resolved before test date:

	Resolution/Date
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

*Resolution of these questions may require preliminary onsite inspection.

PRETEST MEETING SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

10. Calibration gas cylinder or cell information

Pollutant[1]	Range[2]	Carrier[3]	Container[4]	Vendor[5]			Triple Analysis		Cylinder ID#
				ppm Value					
				Gas	Cell	Date[6]	ppm Value[7]	Date[6]	
SO_2	Zero								
SO_2	Mid								
SO_2	Span								
NO_x	Zero								
NO_x	Mid								
NO_x	Span								
O_2/CO_2	Zero								
O_2/CO_2	Mid								
O_2/CO_2	Span								

[1] If NO_x, specify NO or NO_2; if diluent, circle O_2 or CO_2.
[2] As applicable.
[3] Specify carrier gas contained in cylinder or cell.
[4] Specify vendor cell, regulated cylinder, instrument air, or other.
[5] Supplied by vendor when calibration mixture purchased or assigned value of calibration cell.
[6] Give date on which vendor certification and/or triplicate reference method test performed.
[7] Average of three valid reference method tests on cylinders only.

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

GENERAL PERFORMANCE SPECIFICATION INFORMATION

Plant: _____ **OTP Start Date:** _____

OTP Start Time: _____

1. **Observers:** **Affiliation:**

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

2. **Test performed by: (If different from those specified in pretest meeting)**

_____ _____

_____ _____

_____ _____

_____ _____

3. **Were pretest meeting notes reviewed?** Yes: _____ No: _____

4. **Were velocity traverse data taken?** Yes: _____ No: _____

By whom? _____

When taken? _____

5. **Actual zero and calibration schedule:**

_____

_____

_____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

6. **Comments:** _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 1 (OPACITY)

Day in operational test period sequence	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Were initial 24-h readings taken after system was calibrated?								
Were zero readings taken before cleaning and adjustment?								
Value before zero cleaning and adjustment								
Amount of zero compensation before cleaning and adjustment								
Value after zero adjustment								
Were span readings taken after cleaning and zero adjustment, but prior to span adjustment?								
Value before span adjustment								
Value after span adjustment								

NOTE: Complete checklist for portions of test actually observed.

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

	SO_2	NO_x
Manufacturer and model of monitor		
What method was used to perform sampling of calibration gas?[1]		
Is a stainless steel regulator used for each calibration gas? If not, explain.[2]		
Are stainless steel and Teflon® calibration gas sampling system components (lines, valves, fittings) used? If not, explain.[2]		
Were calibration gas/cells certified by: 1. The manufacturer? 2. Other? *(Please explain)*[2]		
What was the concentration of the span gas/cell?		
Is the span value in agreement with the applicable subpart?		

[1]Attach a sketch of sampling train.
[2]Explain in comments section.

Comments: _____

CALIBRATION ERROR TEST

	SO_2	NO_x
1. Was calibration error test performed in the field or in the laboratory?*		
2. Were 15 nonconsecutive readings taken?*		
3. Was entire continuous monitoring system (probe, sample conditioning system, transport system, etc.) subjected to calibration error test?*		

*If the answer to either part of 3 is "No", please explain:

Comments: _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

RESPONSE TIME

	SO_2	NO_x
What was the concentration of the gas or gas cell used?		
Identification number of the tank or gas cell.		
For NO_x monitors which oxidize NO to NO_2, was NO used for response time?		
Was entire continuous monitoring system (including sample conditioning system) used? If not, please explain in Comments section.		
What was the response time? (seconds)		

Comments: _____

ONSITE TEST SUMMARY

CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ZERO AND CALIBRATION DRIFT–24-H

	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8	
	SO_2	NO_x	SO_2	NO_x	SO_2	NO_x	SO_2	NO_x	SO_2	NO_x	SO_2	NO_x	SO_2	NO_x	SO_2	NO_x
Were all readings taken at 24-h intervals?																
Were zero and span gases or calibration cells used?																
If the system was extractive, was span gas/cell 80 to 90% of instrument span?																
If the system was nonextractive, was span gas/cell 45 to 55% of instrument span?																
Were initial 24 h readings taken after system was calibrated?																
Were zero readings taken before adjustment?																
Value before zero adjustment.																
Value after zero adjustment.																
Were span readings taken after zero adjustment, but prior to span adjustment?																
Value before span adjustment.																
Value after span adjustment.																

NOTE: Complete checklist for portions of test actually observed.

1. Were adjustments made only at 24-h intervals?

   Yes: No: ____ If no, explain. _____

2. What is the manufacturer's recommended procedure for zero and span adjustment frequency? _____

3. For in situ monitors using incremental addition method, what are the calibration cell values?

4. Comments: _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ZERO AND CALIBRATION DRIFT–2-H

	SO_2	NO_x
Were 2-h drift readings taken so that no adjustments were made?		
Were a total of 15 nonconsecutive 2-h drift periods completed?		
How many were observed?		
If the system was extractive, was span gas/cell 80 to 90% of the instrument span?		
If the system was nonextractive, was span gas/cell 45 to 55% of this instrument span?		

Comments: _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

REFERENCE METHOD 6

1. How many runs were made? _____
2. Probe type (material): _____
3. Were glass ball joints greased? _____
4. What type of grease? _____
5. Date of last dry gas meter calibration? _____
6. Calibration factor of dry gas meter: _____
7. Were impingers iced down? _____
8. Barometric pressure measured? _____ If not, how were the data obtained? _____
9. Was the first midget impinger filled with 15 mL of 80% isopropanol (100 mL of 80% isopropanol for large impingers)?
10. Were the next two midget impingers filled with 15 mL of 3% H_2O_2 (100 mL of H_2O_2 for large impingers)?
11. What leak check procedure was used?
12. Were laboratory QA samples accepted? _____ Yes _____ No

    Serial Numbers: (1) _____ (2) _____ (3) _____ (4) _____

    If not accepted, please explain.

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

METHOD 6 TESTING

NOTE: No more than one SO_2 accuracy test may be run per hour.

Run Number	1	2	3	4	5	6	7	8	9	10	11	12
Date												
Probe heated?												
Probe free of condensate?												
Initial leak check run? (Optional)												
Was probe purged immediately prior to each test?												
Sample starting time												
Flow rate constant? (1 L/min)												
5-min readings taken for:												
A. Flow rate												
B. DGM volume												
C. DGM temperature												
D. Was temperature leaving last impinger 68° F or less?												
Sample end time												
Total volume sampled												
Final leak test? (Mandatory)												
Sample purge time (Total) > 10 minutes												
Was purge air filtered? (Optional)												
Concurrent moisture test?												
CEM reading												

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

REFERENCE METHOD 6

SAMPLE RECOVERY

Run number	1	2	3	4	5	6	7	8	9	10	11	12
Date												
Sample containers clean												
Container type Glass												
Polyethylene												
Teflon												
Other *(Specify)* _____												
1st impinger (IPA discarded)												
Last 3 impingers, connecting glass rinsed with DI water and combined in recovery containers												
Containers labelled, sealed, and content level marked												
Container code or ID number												

Additional comments: (Include description of general environment of cleanup area)

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

REFERENCE METHOD 6

SAMPLE DISPOSITION:

1. Were samples titrated onsite? Yes: _____ No: _____

2. If no, were they analyzed

   _____ A) At the base laboratory of the test team; or

   _____ B) (Subcontracted to) another laboratory?

3. Who analyzed the samples?

   Name of analyst: _____

   Name of firm: _____

4. Did anyone observe the analyses? Yes: _____ No: _____

   Who: _____

5. Are the data and/or results available? Yes _____ No: _____

   If yes, from whom? _____

   _____

6. Were audit samples included? Yes: _____ No: _____

   Actual values: SO_2 _____ _____

   Observed values: SO_2 _____ _____

Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

REFERENCE METHOD 4

NOTE: Concurrent with Method 6 and/or Method 7

1. Probe type (material): _____
2. Were glass ball joints greased? _____
3. What type of grease? _____
4. Date of last dry gas meter calibration: _____
5. Calibration factor of dry gas meter. _____
6. Were impingers iced down? _____
7. Barometric pressure measured? _____

   If not, how were these data obtained? _____
8. Was silica gel or Drierite used in last impinger _____ ? *(Specify)* _____
9. What leak test procedure was used? _____

   _____

   _____
10. How was moisture determined?

    Volumetrically _____ or Gravimetrically ___ _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

REFERENCE METHOD 4

NOTE: Concurrent with Method 6 and/or Method 7

Run Number	1	2	3	4	5	6	7	8	9	10	11	12
Data												
Probe heated?												
Probe free of condensate?												
Initial leak check run? (Optional)												
Was probe purged immediately prior to each test?												
Sample starting time												
Flow rate constant?												
5-min readings: A. Flow rate												
B. DGM volume												
C. DGM temperature												
D. Was temperature leaving last impinger 68° F or less?												
Sample end time												
Total volume sampled												
Final leak test? (Mandatory)												

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

REFERENCE METHOD 7

NOTE: No more than one NO_x accuracy test may be run per hour

Run Number	1	2	3	4	5	6	7	8	9	10	11	12
Date												
Probe material?												
Was probe heated?												
Barometric pressure taken?												
If not, how was this information obtained?												
Were ball joints greased?												
Type of grease												
Flask evacuated to 75 mm Hg absolute or less? (3 in. Hg)												
Leakage rate under vacuum less than 10 mm Hg in 1 min? (0.4 in. Hg)												
System purged before sampling?												
Flask pressure and temperature taken before sampling?												
Time required to fill flask												
Three flasks shot in three minutes?												
Sample flask shaken for 5 min?												
CEM reading												

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

ACCURACY TEST

REFERENCE METHOD 7

SAMPLE RECOVERY

Run Number	1	2	3	4	5	6	7	8	9	10	11	12
Sample held for 16 h before recovery?												
Sample shaken for 2 min before recovery?												
Flask temperature and pressure recorded before vented?												
Sample containers clean?												
Container type Glass												
Polyethylene												
Teflon												
Other (Flask)												
Rinsed twice with 5 mL DI water?												
pH adjusted to between 9 and 12?												
Containers labelled, sealed, and content level marked?												

What was the environment of the cleanup area? _____

_____

_____

_____

_____

_____

_____

_____

ONSITE TEST SUMMARY
CONTINUOUS EMISSION MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 2

SAMPLE DISPOSITION:

1. Were samples titrated onsite? Yes: _____ No: _____

2. If no, were they analyzed

   _____ A) At the base laboratory of the test team; or

   _____ B) (Subcontracted to) another laboratory?

3. Who analyzed the samples?

   Name of analyst: _____

   Name of firm: _____

4. Did anyone observe the analyses? Yes: _____ No: _____

   Who: _____

5. Are the data and/or results available? Yes: _____ No: _____

   If yes, from whom? _____

   _____

6. Were audit samples included? Yes: _____ No: _____

   Actual values: NO_x _____ _____

   Observed values: NO_x _____ _____

COMMENTS: _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 3 (DILUENTS) (O_2, CO_2)

1. Manufacturer and model of monitor: _____

_____

_____

2. Serial number of monitor: _____

3. Gas sampled: _____

4. Were ORSAT analyses performed to verify diluent monitors? _____

_____

5. If bags were used to collect ORSAT samples, of what material were the bags made? _____

6. Was a calibration curve established to verify the expected response curve as described by the analyzer manufacturer?

_____

_____

_____

_____

_____

_____

_____

7. Were calibration gases (if used) injected at probe? _____

_____

_____

_____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 3

RESPONSE TIME

Diluent	O_2	CO_2
Gas or cell concentration used Low		
Medium		
High		
Was entire continuous monitoring system used? If not, explain.*		
What was the response time?		

*Comments: _____

CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 3

ZERO AND CALIBRATION DRIFT–24-H

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8
Were all readings taken at 24-h intervals?								
Were zero and span gases or calibration cells used?								
If the system was extractive, was span gas/cell 80 to 90% of instrument span?								
If the system was nonextractive, was span gas/cell 45 to 55% of instrument span?								
Were zero readings taken before adjustment?								
Value before zero adjustment.								
Value after zero adjustment.								
Were span readings taken after zero adjustment, but prior to span adjustment?								
Value before span adjustment.								
Value after span adjustment.								

NOTE: Complete checklist for portions of test actually observed.

1. Were adjustments made only at 24-h intervals?

   Yes: ____ No: ____ If no, explain. _____

2. What is the manufacturer's recommended procedure for zero and span adjustment frequency? _____

3. Comments: _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

PERFORMANCE SPECIFICATION 3

ZERO AND CALIBRATION DRIFT–2-H

Diluent	O_2	CO_2
Were 2-h drift readings taken so that no adjustments were made during drift period?		
Were a total of 15 nonconsecutive drift periods completed?		
How many were observed?		
If the system was extractive, was span gas/cell 80 to 90% of instrument span?		
If the system was nonextractive, was span gas/cell 45 to 55% of instrument span?		

Comments: _____

ONSITE TEST SUMMARY
CONTINUOUS EMISSIONS MONITOR OBSERVER'S DATA SHEET

GENERAL COMMENTS ON ENTIRE SAMPLING PROJECT:

Did observer sign observed data sheets? Yes: _____ No: _____

Did observer sign strip charts/computer printouts? Yes: _____ No: _____

Was the test team supervisor given the opportunity to read over this data sheet? _____

Did he do so? _____

Test team supervisor signature: _____

Observer's name: _____

Title: _____

Affiliation: _____

Observer's signature: _____

Date: _____